FWC

G.C.E. (A/L) Examination – March 2020
Conducted by Field Work Center (FWC)
Thondaimanaru
In Collaboration with the Northern Provincial Education

Information & Communication Technology I	Two Hours Gr. 13 (2020)	20	T	I

Instructions :

- Answer **all** the questions.
- Write your **Index Number** in the space provided in the answer sheet.
- In each of the question 1 to 50, Pick one of the alternatives from (1), (2), (3), (4), (5) **which is correct or most appropriate and mark your response on the answer sheet with a cross (X) in accordance with the instructions given on the back of the answer sheet** .
- Use of calculators is **not allowed**

01) Consider the following statements.
A- Charles Babbage invented the Analytical Engine.
B- One of the principal inventors of the Electronic Numerical Integrator and computer (ENIAC) was John Presper Eckert.
C- Howard Aiken proposed the stored program concept first.
Which of the above statements is / are correct?
(1) A only *(2)* B only *(3)* A and B only
(4) A and C only *(5)* A, B and C

02) Which of the following represents the bitwise OR operation of the two binary numbers 10101010 and 01010101?
(1) 00000000 (2) 11110000 (3) 00001111 (4) 11000011 (5) 11111111

03) Consider the following three numbers in decimal, octal and hexadecimal notations, respectively.
A – 217_{10}
B – 661_8
C – $D9_{16}$
Which of the above is / are equivalent to 11011001_2 in binary notation?
(1) A only *(2)* B only *(3)* A and B only
(4) A and C only *(5)* A, B and C

04) What is the binary equivalent to the decimal 45.375_{10}?
(1) 101100.101_2 (2) 101101.001_2 (3) 101101.111_2 (4) 101101.011_2 (5) 101101.101_2

05) Which of the following statements about the seven – state process transition diagram is true?
(1) When a process is created its status should be **running**.
(2) The status of a process in the **blocked** state should change to **running** after completion of the blocked event.
(3) Processes in the **blocked**, **ready** and **running** states are in the main memory.
(4) A status of a process in the **running** state can be changed either to **terminated** or **ready** states only.
(5) A process in **running** state will change its status to the **ready** state when it generates an I/O event.

06) In an operating system, " ..... maps virtual memory address into physical memory addresses"
(1) Swapping 2) Page table 3) Process control block
(4) Long – term scheduler 5) Short – term scheduler

07) Which of the following storage devices is generally considered to provide the fastest access to data?
(1) Cache Memory
(2) RAM
(3) Magnetic disk
(4) Optical Disc
(5) Register

08) Assume that two bits A and B are given to Half Adder. Which of the following truth table is correct with respect to the output of the half adder?

(1)

A	B	Carry	Sum
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

(2)

A	B	Carry	Sum
0	0	0	0
0	1	1	0
1	0	0	1
1	1	1	0

(3)

A	B	Carry	Sum
0	0	1	1
0	1	0	0
1	0	0	0
1	1	0	1

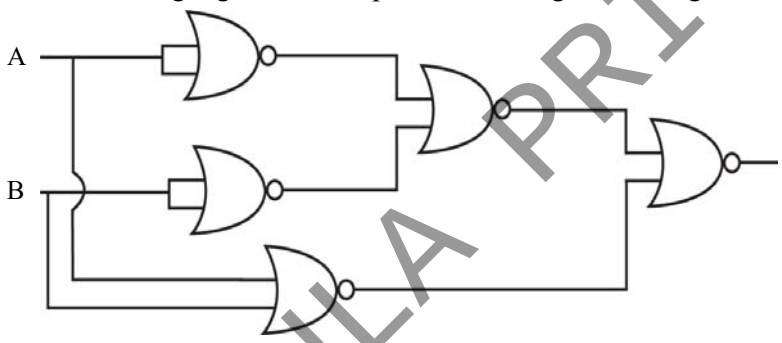
(4)

A	B	Carry	Sum
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0

(5)

A	B	Carry	Sum
0	0	1	0
0	1	0	0
1	0	1	0
1	1	0	1

09) Consider the following logic circuit implemented using universal gates?



The above circuit is equivalent to a / an
(1) XOR Gate
(2) NOR Gate
(3) AND Gate
(4) NOT Gate
(5) NAND Gate

10) Consider the Karnaugh map shown below.

CD \ AB	00	01	11	10
00	1	0	1	1
01	1	0	0	1
11	1	0	0	1
10	1	0	1	1

Which of the following is the correct Logic expression to a sum of products (sop) Boolean expression?
(1) $\overline{A}\,\overline{B} + A\overline{B} + A\overline{D}$
(2) $\overline{B} + A\overline{D}$
(3) $\overline{D} + \overline{B}C$
(4) $\overline{A}\,\overline{B} + A\overline{B} + \overline{A}\,D$
(5) $\overline{A}\,\overline{B} + A\,\overline{B} + AB\overline{D}$

11) Consider the following Statements.
A – Frequency is measured in Hz.
B - The function of the DHCP server in an IP network is to dynamically allocate IP addresses.
C – In the OSI seven layer reference model, IP protocol maps to the transport layer.

Which of the above statements is / are correct?
(1) A only (2) B only *(3)* A, and B only
(4) A and C only *(5)* A, B and C

12) ..... is used for analog signal to digital signal conversion.
Which of the following is most appropriate to fill the blank in the above statement?
(1) Amplitude Modulation (AM)
(2) Frequency Modulation (FM)
(3) Pulse Code Modulation (PCM)
(4) Phase Modulation (PM)
(5) Time Division Modulation (TDM)

13) Local Area Network (LAN) has 1000 network devices. What is the most appropriate subnet mask for this computer network?
(1) 255.255.252.0 (2) 255.255.255.0 (3) 255.255.255.128
(4) 255.255.255.192 (5) 255.255.192.0

14) Two machines with the IP addresses 192.248.16.158 and 192.248.16.218 are connected to a local area network (LAN). Which of the following is a suitable subnet mask for this network?
(1) 255.255.255.192 (2) 255.255.255.248 (3) 255.255.255.240
(4) 255.255.255.128 (5) 255.255.255.224

15) A computer in a network is configured with the IP address 192.248.16.95 and the subnet mask 255.255.255.192. Which of the following IP addresses **cannot** be assigned to a computer in the same network?
(1) 192.248.16.65 (2) 192.248.16.129 (3) 192.248.16.110
(4) 192.248.16.92 (5) 192.248.16.120

16) Which of the following is a correct MAC address?
(1) 192.248.0.0.1 (2) 192.258.16.1 (3) 192.248.16.1
(4) 255.255.0.0 (5) 03:A3:CC:99:C9:AB

17) Which of the following are the properties of a signal?
(1) Amplitude, Impulse, Frequency, Phase
(2) Wavelength, Clock time, Impulse, Amplitude
(3) Amplitude, Frequency, Phase, Wave length
(4) Amplitude, Phase, Clock time, Wave length
(5) Amplitude, Impulse, Phase, Wave length

18) …… is not a data validity check
(1) Type check *(2)* Format check
(3) Double entry check *(4)* Range check
(5) Length check

19) Which of the following statements describes a functional requirement of a digital camera?
(1) Should be light in weight.
(2) Shall be able to provide one year warranty for battery.
(3) Should provide a USB cable
(4) Shall be able to take a photo
(5) Should have a memory card with sufficient capacity.

20) Economic feasibility of a system .....
(1) Involves with cost / benefit analysis.
(2) Determines the technical resources required for the project.
(3) Evaluates hardware and software.
(4) estimates the time required for the completion of the project.
(5) determines whether the organization's needs can be met by implementing the proposed system.

21) Which of the following system development models has an extremely long linear development process?
(1) Prototyping model
(2) Waterfall model
(3) Spiral model
(4) Rapid Application Development model
(5) Agile model

22) Consider the following models :
A – Hierarchical model
B – Network model
C – Relational model

Which of the above is a / are database model/s?
(1) A only (2) B only (3) A and B only
(4) A and C only (5) A, B and C

23) Consider the following statements about **Relational Data bases** :
A - Any subset of Alternate keys is called candidate key.
B – A column of data in a table is called a field / an attribute of that table.
C – Always primary key and foreign key are combined to create a compound key.

Which of the above statements is / are correct?
(1) A only (2) B only (3) A and B only
(4) A and C only (5) A, B and C

❖ Consider the following database table to answer the questions 24 and 25.

Item

Invoice_ No	Cust_Name	Device	Amount
I 001	T.Sukir	Mouse	300
I 001	T.Sukir	Keyboard	200
I 002	A.Niroshan	Mouse	150
I 003	M.Perera	Printer	50
I 003	M.Perara	Scanner	30

24) In which normal form does the above table exist?
(1) Zero normal form (2) First normal form
(3) Second normal form (4) Third normal form
(5) BCNF

25) When convert the above table to third normal form, which of the above format is/are correct?
A – Item (Invoice_No, Cust_Name)
B – Item_ Device (Invoice_no, Device, Amount)
C – Item_Amount (Invoice_No, Amount)
D – Item (Invoice_No, Cust_Name, Device)

(1) A only (2) B only (3) A and B only
(4) A and D only (5) C and D only

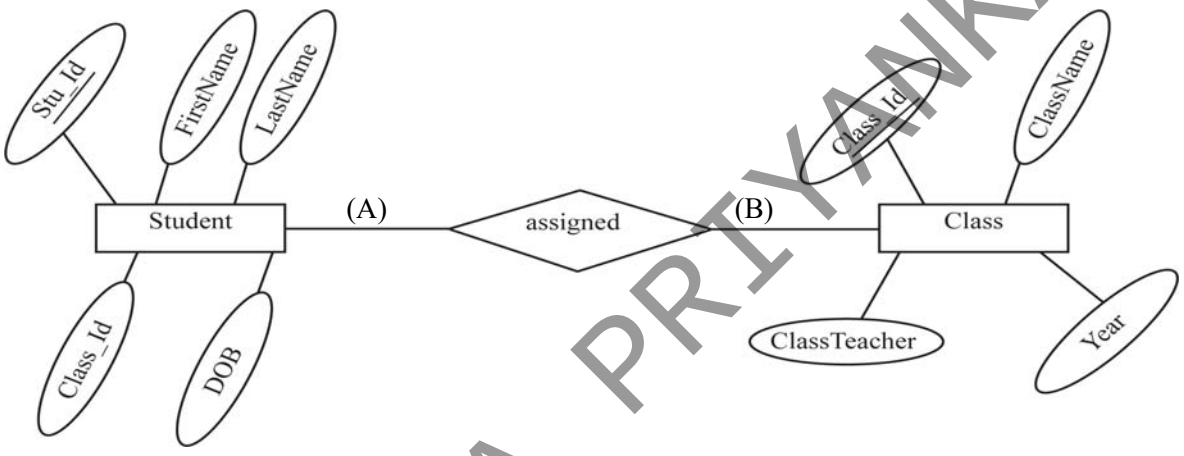
❖ **Consider the following two tables in a relational database to answer question 26 to 28.**

Student

Stu_ Id	Class_Id	FirstName	LastName	DOB
S001	C01	Mohamed	Nazeer	2000.12.16
S002	C02	Sasikumar	Kabilraj	2000.11.06
S005	C01	Sritharan	Thusani	2000.08.11
S007	C03	Pusparasa	Kanista	2000.05.06

Class

Class_Id	Class Name	Class Teacher	Year
C01	12 – Arts	R. Sritharan	2019
C02	12 – Bio	K. Jegatheeswaran	2019
C03	12 – Commerce	V. Piratheepan	2019
C04	12 – Maths	S. Sarvini	2020



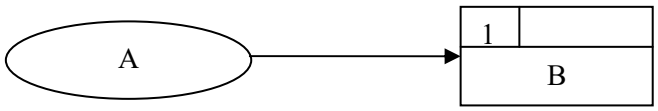
26) Which of the following is the correct primary key for student table?
(1) Class_Id (2) Stu_Id, Class_Id (3) Stu_Id, FirstName
(4) Stu_Id (5) Stu_Id, Class_Id, Name

27) What is the cardinality of the relationship between the entities student and class, denoted by (A) and (B) above?
Note :- Suitable labels for (A) and (B) respectively.
(1) one to one (2) many to many (3) one to many
(4) one to zero (5) many to one

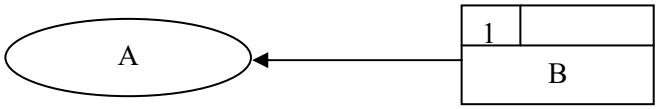
28) Which of the following is the correct SQL statement to retrieve stu_Id, class name and year of all classes?
(1) SELECT Student.Stu_Id, Class.ClassName, Class.Year FROM Student, Class
WHERE Student.Class_Id=Class.Class_Id
(2) SELECT Student.Stu_Id, Class.ClassName, Class.Year FROM Student, Class
WHERE Student.Stu_Id=Class.Stu_Id
(3) SELECT Stu_Id, ClassName, Year FROM Student, Class
WHERE Student.Class_Id = Class.Class_Id
(4) SELECT Stu_Id and ClassName and Year FROM Student and Class
WHERE Student.Class_Id=Class.Class_Id
(5) SELECT * FROM Student, Class WHERE Student.Stu_Id = Class.Class_Id

29) Which of the following data flow diagrams is correct with respect to the rules of data flow modeling?

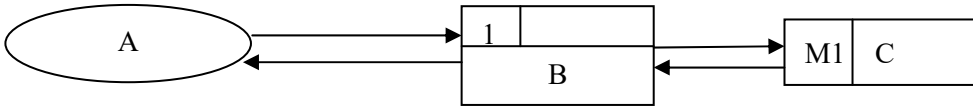
1)



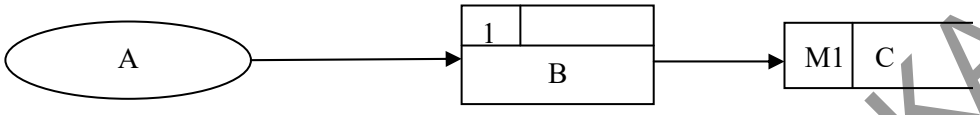
2)



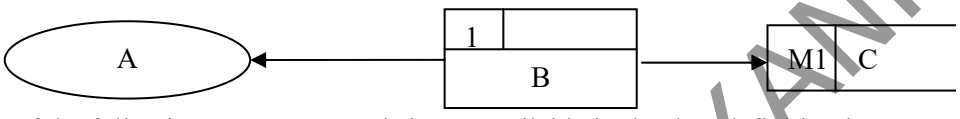
3)



4)



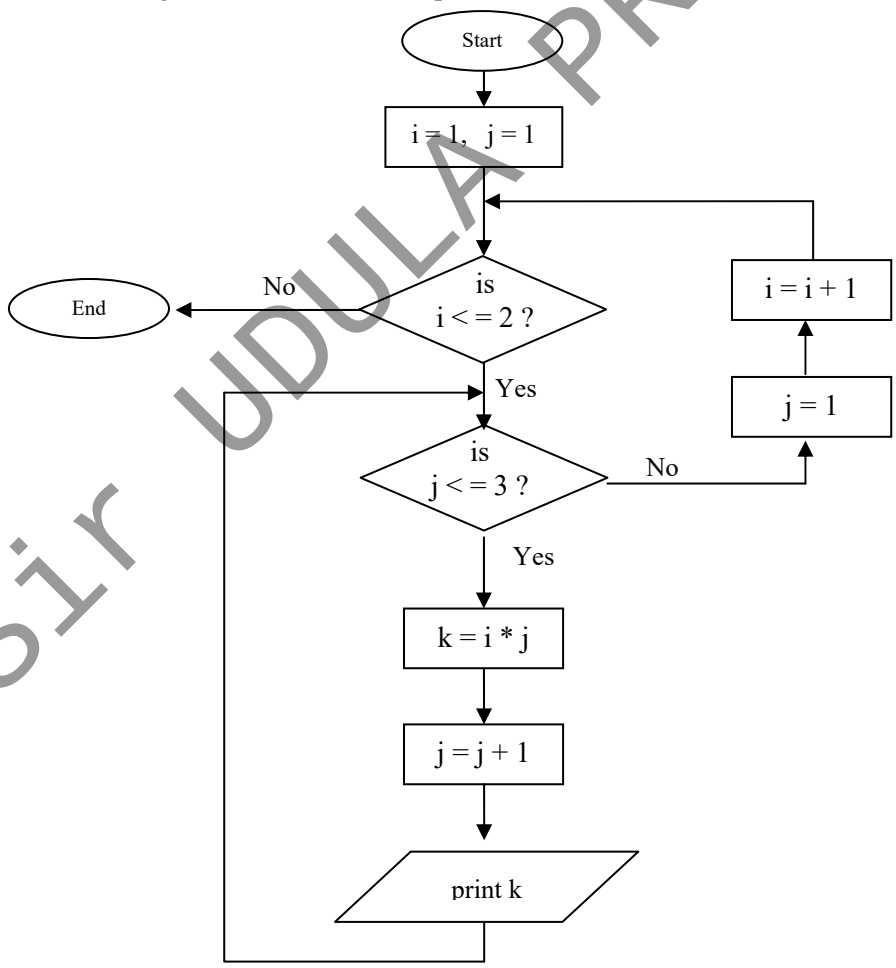
5)



30) Which of the following SQL commands is not available in the data definition language (DDL)?

(1) CREATE (2) DROP (3) ALTER
(4) UPDATE (5) TRUNCATE

❖ Use the following flow chart to answer questions 31 and 32.



31) What is the output of the algorithm represented by this flowchart?

(1) 1 2 3 4 5 6 (2) 1 2 3 2 4 6 (3) 2 4 6 8 10 12 (4) 4 2 6 4 8 6 (5) 2 3 4 5 6 7

32) Which of the following python programs correctly implements the above flow chart?

(1)

```
def fun( ):
i=1
j=1
for i in range (1,3):
for j in range (1,4):
k=i*j
print(k)
fun( )
```

(2)

```
def fun ( ) :
    for i  in range (1,3) :
        for j in range (1, 4):
        k = i * j
        j = j + 1
        i = i + 1
      print (k)
fun( )
```

(3)

```
def fun( ):
   for i in range (1,3);
      for j in range (1,4);
         k=i*j
         print(k)
fun( )
```

(4)

```
def fun( ):
   for i in range (1,3):
      for j in range (1,4):
         k=i*j
         print(k)
fun( )
```

(5)

```
def fun( ):
   for i in range (1,3):
      for j in range (1,4):
         k=i+j
         print(k)
fun( )
```

33) What will be the output of the following python code?

```
m = 4
def fun (n,m):
   if n>m:
      return n
   else:
      return m
print(fun(5,6),m)
```

(1) 6 5 (2) 6 6 (3) 6 4 (4) 5 6 4 (5) 5 6

34) Consider the following python program :

```
temp = [10, 12, -3, 0, 5, 7, 9, 11, 13, 15]
print(temp[2:8:3])
```

What is the output of the above program?

(1) [-3,7] (2) [-3,5,9] (3) [-3, 7, 13] (4) [12, 5, 11] (5) [-3,13,0]

35) What is the output of the following python code?

```
a={4,5,6,7}
b={6,7,8,9}
print(a&b)
```

(1) {6,7} (2) {4,5,6,7,8,9} (3) {4,5,6,7,6,7,8,9} (4) {4,5,8,9} (5) Error

36) What is the value of the following python expression?

```
print((5%3+4*2-2**2)&20>>2)
```

(1) 0 (2) 1 (3) 4 (4) 6 (5) 7

37) What will be the output of the following python code segment?

```
s = set ([1,1,2,2,2,3,5])
print(len(s))
```

(1) 7 (2) 6 (3) 5 (4) 4 (5) (1,2,3,5)

38) Which of the following "Python" statement / s is / are acceptable?
A – a, b, c= 5.2e2, "abc"
B – a, b = "b", 10
C – a = True # Logical expression
D – a = FALSE

(1) A and B only (2) A and C only (3) B only
(4) B and C only (5) B, C and D

39) What is the output of the following python program?

```
s ="Hello World!"
print (s[-5: -2])
```

(1) Wor (2) orl (3) Wo (4) llo (5) ell

40) What will be the output of the following python code segment?

```
x = 10
while x>0:
  x =x-1
  if  x==7:
     continue
  if  x==5:
    break
  print(x,end =' ')
```

(1) 9 8 6 5 (2) 10 7 5 (3) 9 8 7 6 (4) 10 9 8 6 (5) 9 8 6

41) Which of the following is a server-side scripting language that is commonly used to add interactivity to web pages?
(1) HTML (2) JavaScript (3) JQueary (4) Ajax (5) PHP

42) Which of the following is a valid example for CSS Id selector?
(1) .myid{color:red;text-align:center;}
(2) #myid{color:red;text-align:center;}
(3) myid{color:red;text-align:center;}
(4) myid:{color:red;text-align:center;}
(5) myid;{color:red;test-align:center;}

43) Consider the following HTML element
Attributes
The value of the attribute 'target' in the above specifies that the linked document 'attributes. html' should be opened in
(1) a new tab or window
(2) the parent frame
(3) the full body of the current window
(4) the same frame
(5) the frame named "top"

44) Consider the following HTML code :

```
<ul>
<li> Computer</li>
<ul>
<li> Input Devices </li>
<ul>
<li> key board </li>
<li> Scanner </li>
</ul>
</ul>
</ul>
```

Which of the following is the output generated by the above code?

(1)
- Computer
  - Input Devices
    - Key board
    - Scanner

(2)
- Computer
- Input Devices
- Key board
- Scanner

(3)
- Computer
  - Input Devices
    - Key board
    - Scanner

(4)
- Computer
  - Input Devices
    - Key board
    - Scanner

(5)
- Computer
  - Input Devices
    - Key board
    - Scanner

45) Which of the following will be used to define an external CSS?

(1) <link src = “abc.css” rel = “stylesheet” type = “text/css”>
(2) <link href = “abc” rel = “stylesheet” type = “text/css>
(3) <link href = “abc.css” type = “text/ css”>
(4) <link href = “abc.css” rel = “stylesheet” type = “text/css”>
(5) <href link = “abc.css” rel = “stylesheet” type = “text/css”>

46) Consider the following HTML code for creating a table.

```
<table border = “1”>
<tr><th colspan = “2”> Students </th></tr>
<tr><td rowspan= “2”> Name </td>
<td>Vithu</td></tr>
<tr><td>Tharani</td></tr>
</table>
```

Which of the following is the output generated by the above code?

(1)

Students	Name
	Vithu
	Tharani

(2)

Students	
Name	Vithu
	Tharani

(3)

Students	
Name	
Vithu	Tharani

(4)

Students	Name
Vithu	Tharani

(5)

Students	Name	
	Vithu	Tharani

47) Consider the following output segment of a HTML form

Enter Password [••••••]

What is the correct code which can be used to get above output?

(1) Enter Password <input type = “password” size = “6” maxlength = “15” name = “pwd” / >
(2) <input type = “password” size = “15” maxlength = “6” name = “Enter Password”/>
(3) <input type = “text” size = “6” maxlength = “15” name = “Enter Password” / >
(4) Enter Password <input type = “text” size = “15” maxlength = “6” name = “pwd” />
(5) Enter Password <input type = “submit” size = “6” maxlength = “15” name = “pwd”/>

48) Which of the following symbol is used to write comments in a PHP program?
(1) -- (2) <!- - comment --> (3) //
(4) * (5) %

49) Which of the following statements is correct with respect to Internet of Things (IoT)?
(1) Every IoT device or item must be connected using UTP cables.
(2) IoT environments cannot be monitored and controlled remotely.
(3) In IoT devices talk to each other.
(4) All IoT applications are highly secured systems.
(5) Modern smart mobile phones cannot be connected to an IoT setup.

50) Consider the following statements
A – Computer manufacturing companies store the BIOS commands in a ROM with a smaller capacity.
B – A utility software is an example for firmware.
C – Typically the cache memory is used to store the most frequently accessed data temporarily.

Which of the above statements is / are correct?
(1) A only (2) B only (3) B and C only
(4) A and C only (5) A, B and C

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Part -A
Structured Essay
Answer all four questions on this paper itself.

01) (a) Internet of Things (IoT), State whether the following statements are **true** or **false**.

(i) Embedded system describes as, computer system embedded into some other system to get some dedicated task done ( )

(ii) Sensors, Processor and Actuators are the main components of the Internet of Things (IoT) system. ( )

(iii) Embedded instruments strict constraints very small, low current consuming and very fast. ( )

(b) (i) What is the structural difference between the microprocessor – based and microcontroller – based?

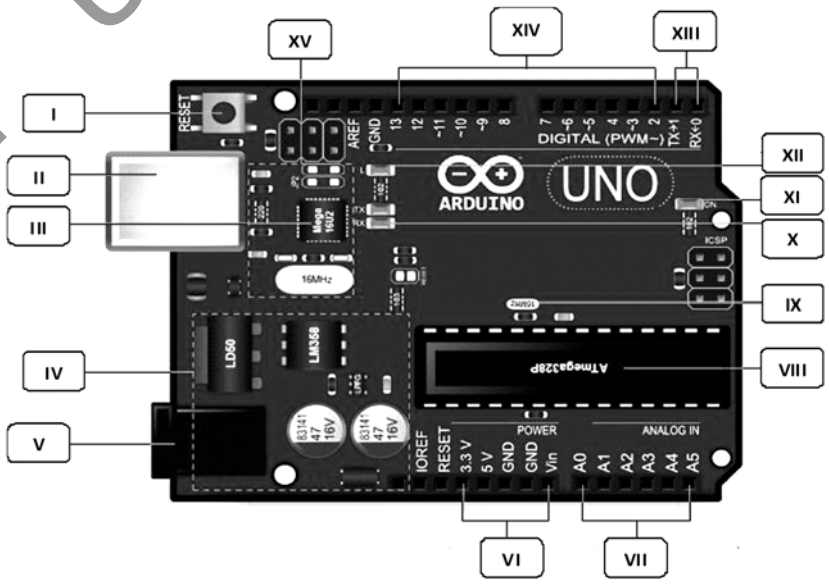
……..

……..

……..

(ii) **Arduino Uno** is labeled from (I - XV) choose the most suitable item given in the following list.

List :- {USB Port, 16 MHz Oscillator, LED connected to digital pin 13, Reset button, Microcontroller, USB – Serial interface control circuit, USB – Serial interface controller, Power supply circuit, Tx & Rx indicators, Digital I/O pins, Tx & Rx pins, Power pins, Power indicator, Analog Input pins, Power supply jack}



I) …… IX) ……

II) …… X) ……

III) …… XI) ……

IV) …… XII) ……

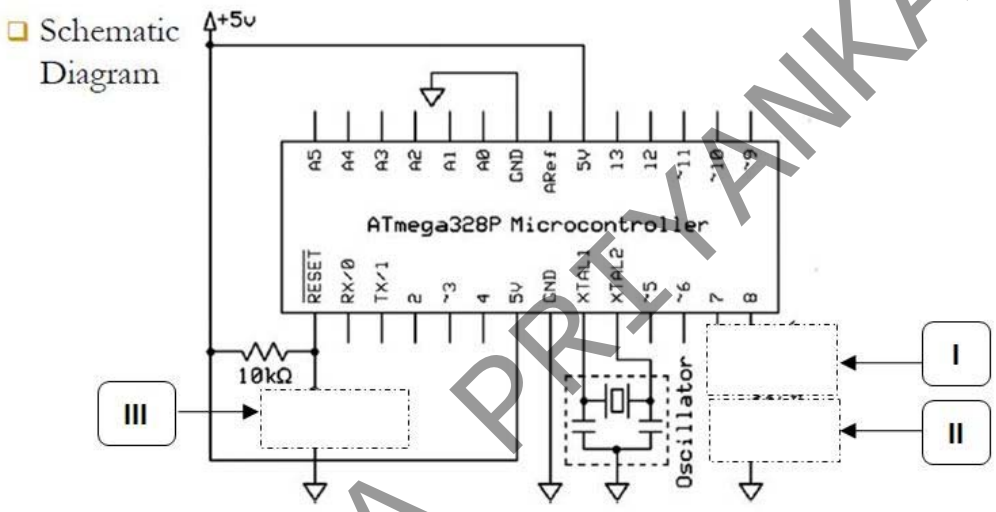
V) …… XIII) ……

VI) …… XIV) ……

VII) …… XV) ……

VIII) ……

(C) (i) Draw the leaving part of the schematic Diagram, When the LED blinks every $\frac{1}{2}$ a second.



(ii) Fill in the source code blank if the LED Blinks every $\frac{1}{2}$ a second.

```
const int ledPin = 8;          // declare digital I/O pin 8 as ledPin
void setup ( )
{
      ……I……;                  // configure ledPin as output
 }
void loop ( )
{
digitalWrite (ledPin, HIGH);    // set ledPin High
      ……II……;                  // wait for 500ms
      ……III……;                 // set ledPin Low
      ……IV……;                  // wait for 500ms
}
```

I) ……

II) ……

III) ……

IV) ……

02) (a) Consider the definition list given below rendered by a web browser

Commerce
- Business studies
- Economics
- Accountancy

Bio Science
- Biology
- Physics
- Chemistry

Write down the HTML code segment to display the above list.

……..
……..
……..
……..
……..
……..
……..
……..
……..
……..

(b) Write the output of the following HTML code segment when rendered by a web browser.

```
<html>
<body>
<center><h1> ICT </h1></center>
<p> Information &amp Communications
    Technology <br> is an <u> extensional
    </u> term for </p> IT <br>
    I <sub> C </sub> T
    <!-- Information -->
</body>
</html>
```

……..
……..
……..
……..
……..
……..
……..

(c) Consider the following CSS rules

```
P{color:#00FF00;}
#para1{color:#FF0000;}
.Para2{color:#0000FF;}
.Para3{color:#000000;}
```

State the color of the text in the following paragraph. Give the reasons for your answer.

HTML Code segment	Color	Reason
Sri Lanka		
< p class = “para2” > Sri Lanka		
Sri Lanka		
  Sri Lanka 		

(d) Following PHP code is intended to update data into ‘Address’ and ‘Class’ fields ‘S0001’ of the table named ‘Student’ in the MySQL database called “school_info_sys”. User name and password to login to “school_info_sys” are ‘root’ and ‘12345’ respectively. Complete the PHP code segment by filling the blanks.

```
<? php
        $server = “localhost”;
        $user = “…….(I)……..”;
        $pass = “……(II)……...”;
        $db = “……(III)……...”;
        $con = mysqli_connect ($sever, $user, $pass, $db);
        if (!$con)
         {
        die (“There is a problem in server connection!”.mysqli_connenct_error());
          }
        $sql = “ ……(IV)… ……(V)…. SET ……(VI)…. = ‘Colombo’, Class = ‘Gr 13’
       WHERE Stu_Id = ‘S0001’”;
        if (mysqli_query($con, $sql))
          {
        echo “Record updated successfully”;
        }
        else
        {
        echo “Error updating record:”.mysqli_error($con);
          }
        mysqli_close($con) ;
        ?>
```

(I) ……... (II) ……...

(III) ……... (IV) ……...

(V) ……... (VI) ……...

03) (a)

(i) Write down the two's complement representation of 23_{10} using 8 bits.

……

……

……

(ii) Write down the two's complement representation of -57_{10} using 8 bits.

……

……

……

(iii) Compute $-57_{10} + 23_{10}$ using the above representation (i) and (ii).

……

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(iv) List the steps necessary to transform the result obtained in section (iii) above into decimal form in order to print the answer.

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(b) Flip flops used to save bits in electronic circuit

(i) Create S- R flip flops by using NAND gate

……

……

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(ii) Describes how to save bits in flip flops?

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(c) Three inputs like A, B and C are received by full – Adder then provides sum and carry bit as outputs.

(i) Obtain the truth table for sum and carry of flip flop?

……...

……...

……...

(ii) Construct a logic circuit for flip flop with the output of sum and carry are in same logic circuit.

……...

……...

……...

……...

……...

(d) Factorial of a positive integer n is defined as n x (n-1) x (n-2) x …… x 3 x 2 x 1
Write a python function to factorial of a positive integer?

……...

……...

……...

……...

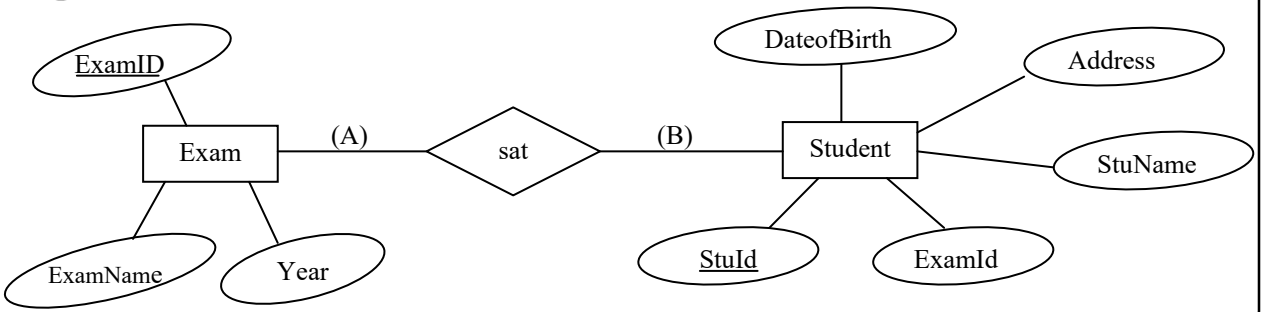
04) The following two tables are constructed by using the Entity Relationship (ER) diagram shown in figure

Exam

ExamId	ExamName	Year
E001	GCE (O/L)	2019
E002	GCE (A/L)	2019
E003	Term 1	2018
E004	Term 2	2019
E005	Term 3	2019

Student

StuId	StuName	Address	DateofBirth	ExamID
S0001	T. Pirasanth	Jaffna	2001.12.05	E002
S0002	V.Jansan	Vaddukoddai	2001.10.03	E001
S0003	T. Luxshya	Chankanai	2001.03.09	E001
S0004	P.Kanista	Chunnakam	2001.04.10	E004
S0005	S.Arvinth	Jaffna	2000.12.21	E005



(a) What is the cardinality of the relationship between the entities exam and student, denoted by (A) and (B) above? Note : Write down suitable labels for (A) and (B), respectively.

.....

.....

(b) Are the two table's Student and Exam, in second normal form (2 NF)?
Explain reason for your answer referring to tables.

……..

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……..

(c) Write a SQL statement to create a student table in a database.

……..

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……..

……..

(d) Write a SQL statement to display StuName, ExamName and Year of all students.

……..

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……..

……..

(e) Write a SQL statement to insert the following record to the student table:

S0006	S.Nazeer	Colombo	2000.07.23	E002

……..

……..

……..

……..

……..

……..

FWC

G.C.E. (A/L) Examination – March 2020
Conducted by Field Work Center (FWC)
Thondaimanaru
In Collaboration with the Northern Provincial Education

Information & Communication Technology II	Gr. 13 (2020)	20	T	II

Part -B

Answer any four questions only.

01) Suppose a logic circuit needs to be implemented for a digital system that has three inputs A, B and C and one output Z. Its behavior is as follows:

A digital circuit takes three binary digits as an input, and produces 1 as its output if the decimal value represented by the three binary digits is a **prime number** (Have only two factor numbers), and 0 otherwise. Assume that all three binary digits represent positive decimal values.

(a) Obtain the truth table for the output Z.

(b) Write down a sum of products (SOP) Boolean expression for Z.

(c) Simplify the Boolean expression obtained in section (b) above, using Boolean algebra. Clearly show all the workings and Boolean algebra rules used for this simplification.

(d) Simplify the Boolean expression obtained in section (b) above, using Karnaugh maps.

(e) Construct a logic circuit for section (d) above, using NAND gates only.

02) a) A university has several faculties and networks following are the number of computer in each faculty.

No	Faculty	No of computers.
1	Science	28
2	Management	18
3	Arts	21
4	Medicine	9
5	Education	7
6	Law	10

The Vice Chancellor has received the 192.188.10.0 / 27 IP address block for the university. Each faculty needs to have their own local area network

(i) Write down the subnet mask for the above university network.

(ii) State the number of sub networks suitable for this computer networks and the number of computers connected to a sub networks respectively.

(iii) Assuming to assigning the IP addresses to the computer after the first six subnet placed in the order of the specified table from six faculties.

Assuming such subnetting is done, write down the relevant network address, broad cast address and the allocated range of usable IP addresses for each building using the following table format to present your answer.

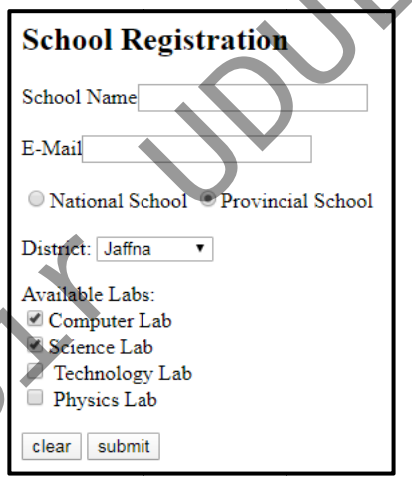
Faculty	Network address	Usable IP address range	Broad cast address.
1. Science			
2. Management			
3. Arts			
4. Medicine			
5. Education			
6. Law			

b) The university links the five faculties Management, Arts, Medicine, Education and law to the science faculty and connects those faculties to the internet through the science faculty. The network has been completed by laying the cables and installing six switches, a router and a firewall all six faculties are situated in six separate buildings. The administrator allows all subnets to access the internet through a proxy server. The proxy server and the DNS server are located in the science faculty.

Draw the labeled network diagram to show the logical arrangement of the computer network of the university by identifying suitable devices and required cables for all the locations.

c) Compare computer network models OSI and TCP / IP in the same diagram.

03) a) Consider the HTML form given below rendered by a web browser.



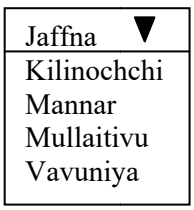


Figure 3.1

This is a registration form used for registering schools. Using appropriate HTML tags create an HTML file to render the school registration form. The options for 'District' are given in the figure 3.1

When the 'Clear' button is clicked , all the entries of the form should be cleared. Similarly when the 'submit' button is clicked, the form should be submitted to the server.

b)

(i) Write a php script to print the string "Hello world" on the screen.

(ii) Name two different techniques that can be used in web programming to retain data among multiple HTML sessions.

(iii) Give a main difference between these two techniques.

(iv) Consider the following php script

```
<? php
$name1="Nimal";
$name2="Kamal";
echo "$name1".'$name2';
? >
```

What would be the output of the script when it is executed?

04) a) Explain what is done by the python interpreter when executing the following python statements.

(i) $x = 5$

(ii) $y = [3, 2, 5, 6]$

(iii) z = int (input ("Enter a number :"))

b) A series number 0,1,1,2,3,5,8,13,21,..... (Fibonacci numbers) are formed user enter a value, as a output be a counting number series.

(i) Draw a flowchart for this?

(ii) Write a python program to implement this flowchart.

05) Lectures have their LecturerId, Name and Rank. Projects have the details of ProjectId, sponsor's Name, starting date and ending date. Students have their StudentId, Name and DegreeProgram.

A lecturer will work at least on a project. Each project has one or more lectures. Lecturers can be worked in one or more projects. Each project is conducted by one or more students. Lectures want to supervise the students working on the project. Students working on the project. Students can be worked on many projects. University has many faculties have FacultyId and FacultyName. Each faculty is monitored by a lecturer. Lecturer can be worked in one or more faculties. Each student has a main faculty based on studies. University has many societies. Societies have societyId and society name. Students are the members of a society based on the course degree project.

Draw an Entity relationship (ER) diagram to represent the scenario given above. In your diagram the attributes cardinality and the primary keys should be clearly indicated. Clearly state your assumptions, if any.

06) a) "ABC" school management wanted to introduce computerized system to maintain the school student information.

(i) Briefly explain the reasons why computerized system is useful to maintain student information.

(ii) List two advantages of using spiral model rather than waterfall model for the above.

(iii) School management has said that parallel implementation is more suitable way to install a new computer based information system. Briefly explain two reasons to support their statement.

(iv) Briefly explain the key difference between functional and non – functional requirements as used in the system development life cycle.

b) **Food ordering system** has the following activities:

A Customer can place an order. The Order Food process receives the Order, forwards it to the Kitchen, store it in the Order data store, and store the updated Inventory details in the Inventory data store. The process also delivers a Bill to the Customer.

The Manager can receive Reports through the Generate Reports process, which takes Inventory details and Orders as input from the Inventory and Order data store respectively.

The Manager can also initiate the Order Inventory process by providing Inventory order. The process forwards the Inventory order to the Supplier and stores the updated Inventory details in the Inventory data store.

Draw level 1 of the dataflow diagram (DFD) for the above situation. Show clearly all the external entity, process, data flow and data store by using structured system analysis and design method (SSADM)